

APPENDIX N
RESPIRATORY PROTECTION PROGRAM

1. Purpose. To prescribe requirements and procedures for the selection, use, care, and maintenance of respirators.

2. Applicability. This appendix applies to all elements of the Buffalo District, both military and civilians. Contractors are required to submit a SOP (Standard Operating Procedure) on the proper use and handling of respirators (For contractors requirement see EM 385-1-1 and Title 29 CFR 1910.134).

3. References.

a. 29 CFR 1910.134, OSHA Standard for Respiratory Protection.

b. AR 40-5, Health and Environment.

c. ER 385-1-90, Respiratory Protection Program.

d. TB MED 502, Respiratory Protection Program.

e. EM 385-1-1, General Safety Requirements.

f. ANSI Z88.2, Practice for Respiratory Protection.

g. AR 11-34, The Army Respiratory Protection Program.

4. Background. When working with toxic materials, it has long been recognized that the respiratory tract is the most important route by which toxic substances enter the body. Most industrial poisonings are caused by inhaling toxic substances. The primary effort to control such hazards should be in the form of engineering controls, such as specially designed ventilation systems. If engineering controls cannot be implemented, or are cost prohibitive, infeasible, or inadequate, respirators must be used to protect the individual whenever hazardous conditions exist. A respiratory protection program shall be established and implemented in accordance with ANSI Z88.2, and the Joint NIOSH/OSHA Standard Completion Program Respirator Decision Logic and Appendix N of EM 385-1-1. This program encompasses training, maintenance, care and awareness of the limitations associated with various types of respirators.

5. Responsibilities.

a. Each Area/Resident/Project Office shall become familiar with the respiratory protection program as outlined in this appendix. A copy of the program shall be maintained in the local office.

b. All supervisors shall:

(1) Request assistance from the S&OH Office in conducting atmospheric testing of area to determine if employees are exposed to contaminant levels in excess of the threshold limit values (TLV) and permissible exposure limits (PEL).

(2) Request assistance from the S&OH Office for fit testing of respirators.

(3) Enforce the use of respirators by employees. Written documentation of employees failure to wear respirators shall be cause for disciplinary action and shall be forwarded to the S&OH Office for inclusion in the employees medical records.

(4) Ensure all employees are trained in the proper use of respirators and report to medical surveillance examinations.

(5) Determine that compressed air breathing system alarms are tested prior to use in potentially IDLH (Immediately Dangerous to Life or Health) situations.

c. All employees shall:

(1) Wear and maintain respirators as required.

(2) Notify supervisors of any problems with respirators or if having respiratory problems.

(3) Report for training and medical surveillance examinations.

d. The Safety and Occupational Health Office:

(1) Ensure supervisors are notified of employees annual physical.

(2) Ensure proper medical examination requirements are followed, i.e., Pulmonary Function test, etc.

(3) Ensure all respirators are approved by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA). Bureau of Mines (BM) approved Self-Contained Breathing Apparatus (SCBA) and Gas Masks may continue to be used until stocks are exhausted, if they meet current requirements for the specific hazard. The current "NIOSH Certified Equipment List" provides information on what is the appropriate respirator to use, and if the respirator is approved. This publication is available at the S&OH Office.

(4) Provide oversight to ensure compliance with the Respiratory Protection Program.

6. Program Requirements.

a. Respirators/canisters shall be selected according to the hazards to which the worker is exposed, this program means project personnel must know which type of respirator/canister to use in each particular situation. For guidance refer to EM 385-1-1, Appendix N or Section 1 of this appendix.

b. Supervisors shall be instructed in the proper use of respirators and their limitations. Respirators designed for protection against one hazard may be totally ineffective against another.

c. Employees shall ensure respirators are regularly cleaned, disinfected, and stored in a convenient, clean, and sanitary location.

d. The compressor for supplying air for breathing shall be equipped with necessary safety and standby devices; this means that if an oil lubricated compressor is used, it shall have a high temperature, equipment failure and carbon monoxide continuous monitoring alarm, a particulate filter, an activated charcoal canister for organic vapors and an oil moisture separator. All air line couplings must be incompatible with outlets for other gas systems. On all gasoline and diesel compressors, the exhaust and inlet ducts shall be separated by a minimum of 10 feet.

e. Employees shall be trained in the care of their respirator. Training shall include the following: Inspection for defects, cleaning and disinfection, repair, and storage.

f. Prior to initial use, supervisors shall have breathing air for respirators supplied from cylinders or air compressors tested and shall comply with the following specifications for Grade D air: Oxygen 19.5-23.5 %, Hydrocarbons less than 5 Mg/cubic meter, Carbon Monoxide less than 20 ppm, and Carbon Dioxide less than 1000 ppm. Oxygen must never be used with air-line respirators or in apparatuses that have previously contained or used compressed air.

g. Cylinders shall be visually inspected by supervisors in accordance with DOT requirements contained in 49 CFR parts 171-179 and 14 CFR part 103. Where DOT is not applicable, the inspections shall be conducted in accordance with Compressed Gas Association Pamphlets C-6 and C-8.

h. Supervisors shall not assign personnel to tasks requiring the use of respirators unless it has been determined that they are medically able to wear respirators while performing their work. See paragraph 10 of this appendix.

7. Training Requirements and Use of Respirators.

a. Supervisors as well as employees must know which respirators and cartridges are to be used in each situation. This must also be outlined in the form of written procedures (Refer to EM 385-1-1, App. N and TB MED 502). Contact the S&OH Office when assistance is necessary as new operations or projects develop.

b. An additional person must be present in areas where the failure of a respirator could result in the wearer being overcome by a toxic or an oxygen deficient atmosphere. Communications (visual, voice, or signal line) will be maintained between both or all individuals present.

c. Supervisors shall ensure that their employees have an opportunity to handle the respirator, have it fitted properly, test its seal, and familiarize themselves with the respirator by wearing it at periodic training sessions.

d. It must be stressed that respirators shall not be worn when a good fit can not be achieved. A good fit cannot be achieved by anyone who has a beard, long sideburns, a long mustache, or stubble. Facial hair does not effect the fit of an air-supplied hood respirator. Also, the absence of dentures can effect the fit of a face piece.

e. If air line respirators are used, the supplied air source shall not be able to be expended and the hose length cannot exceed 300 ft. from the source to the user.

f. The wearer of any type respirator shall not be allowed to wear contact lenses. If a spectacle, goggle, face shield, or welding helmet must be worn with a face piece, it shall be worn so as not to adversely effect the seal of the face piece to the face.

8. Maintenance, Care, and Storage.

a. All respirators shall be inspected by the employee for defects before and after each use and at least monthly to assure it is in good working order. The inspections shall include a check of the tightness of the connections and a check of the face piece, valves, connecting tube, canister, and cartridge. All rubber and elastic parts must be inspected for pliability and signs of deterioration.

b. Self-contained breathing apparatus shall be inspected by the employee monthly. Air cylinders shall be fully charged according to the manufacturers instructions.

c. A monthly record shall be kept by the supervisor of inspections and findings for respirators maintained for emergency use. Respirators intended for emergency use must be clearly accessible and stored in compartments built for such purposes; such compartments should be clearly marked.

d. If respirators are used regularly, they may be assigned to individual workers for their exclusive use.

e. Respirators shall be regularly cleaned and disinfected. Those issued for the exclusive use of one worker shall be cleaned after each days use. Those used by more than one person shall be thoroughly cleaned and disinfected after each use. To clean and disinfect respirators, they should be washed with detergent in warm water using a soft brush, rinsed thoroughly in clean water, rinsed in a disinfectant solution, rinsed again in clean water (to prevent skin irritation), and air-dried in a clean place. Cleaner and sanitizer solutions that clean effectively and contain bactericide are also available.

f. After inspection, cleaning, and necessary repair, respirators shall be stored in sanitary locations to protect against dust, sunlight, heat, extreme cold, excessive moisture,

and damaging chemicals. It is useful to store non-emergency respirators in plastic bags after they have been cleaned and disinfected.

g. Defective respirators shall be tagged and removed from service by the supervisor.

h. Respirators shall not be stored in tool boxes and lockers unless they are in carrying cases or other protective containers.

i. When stored, the face piece and exhalation valve must be in an upright or resting position. If stored in a bent, folded, or abnormal position, the face piece and exhalation valve can warp or become deformed and thereby void the NIOSH/MSHA APPROVAL.

9. Identification of Respirators, Canisters, and Cartridges.

a. Most manufacturers use the following guidelines when designing their product; therefore, while the identification information given below is necessary to know, it is usually not of major significance to the purchaser. Assistance in ordering specific respirator equipment may be obtained from the S&OH Office.

b. The primary means of identifying gas mask canisters should be by use of properly worded labels. Each canister shall have bold letters stating "Canister for (name of contaminant)." It shall also state "for respiratory protection in atmospheres containing not more than X percent by volume of (name of contaminant)."

c. Each canister shall have a label warning that gas masks should be used only in atmospheres with enough oxygen to support life (at least 16 percent by volume), since the cartridges are only intended to neutralize or remove contaminants from the air.

d. Each canister shall be painted a distinctive color or for a particular contaminant. For example, an organic vapor canister is signified by the color black; a canister for use in ammonia gas atmospheres (limited to 300 ppm) is green.

e. The use of one manufacturers respirator cartridge in conjunction with another manufacturers respirator is unacceptable. The problem with interchanging brand names is that an airtight seal cannot be guaranteed. In addition, the interchanging of respirator components voids any approval granted by NIOSH/MSHA.

10. Medical Requirements. It is important that no employee be assigned to tasks requiring the use of respirators if, based upon their most recent medical examination, the examining physician determines that the employee will be unable to function normally while wearing a respirator, or that the safety and health of the employee or other employees will be impaired by their use of a respirator. The focus of the medical examination should be on pulmonary and cardiovascular related problems. Workers who have indications of coronary artery disease, myocardial infarction, angina pectoris, or progressive or severe hypertension should only wear a continuous flow air line respirator unless approval from their physician is obtained. Those whose duty it is to respond to emergencies should not wear any type of respirator if they have a cardiovascular deficiency. Other physical conditions, such as diabetes or grand mal epilepsy, may limit wearing of respirators. With any individual medical problem, the final decision regarding respirator use is the responsibility of the examining physician.

SECTION 1
GUIDE FOR SELECTION OF RESPIRATORS

A-1. The FOA Safety and Occupational Health Office is responsible for advising supervisors on the type of respirator required. In selecting a respirator, Safety/Health and supervisory personnel should assemble the information needed by answering the following questions:

- a. What is the measured or estimated contaminant concentration at the breathing zone of the worker?
- b. What is the Permissible Exposure Limit (PEL) and/or Threshold Limit Value (TLV) of the contaminant? (Use more stringent of the two).
- c. Is the workspace oxygen deficient (less than 19.5% oxygen)?
- d. What is the lower explosive limit (LEL) of the contaminant?
- e. Does an IDLH situation exist at contaminant concentration?
- f. If gas or vapor --
 - (1) Is efficient sorbent available?
 - (2) Does contaminant have adequate warning properties?
- g. Will eye irritation occur at contaminant concentration?
- h. Will skin absorption pose a problem?
- i. Are there other circumstances/conditions which should be considered?

A-2. Using the above information and Table A-1 and A-3, select the proper type of respirator and facepiece. Sections of these tables have been extracted from OSHA Instructions 2-20.20 Ch-4, 4 JUN 82, the original sources being "ANSI STANDARDS" and "Respirator Protection Factors" E. Hyatt, Los Alamos Scientific Laboratory Publication LA - 6084 - MS, Jan 76.

TABLE A-1

RESPIRATOR SELECTION GUIDE

HAZARD	TYPE RESPIRATOR
<u>GASES OR VAPORS</u>	
Oxygen Deficiency	Self-contained breathing apparatus, positive pressure mode. Combination air-line respirator with auxiliary positive pressure self-contained air supply.
Immediately dangerous to life or health (IDLH)	Self-contained breathing apparatus in positive pressure mode. Combination air-line respirator with auxiliary positive pressure self-contained air supply.
Not immediately dangerous to life health	Air-line respirator. Air-purifying, half-mask or full or facepiece respirator with chemical cartridges or canister.
<u>PARTICULATES</u>	
Immediately dangerous to life or health (IDLH)	Self-contained breathing apparatus in positive pressure mode. Combination air-line respirator with auxiliary positive pressure self-contained air supply.
Not immediately dangerous to life or health	Air-line respirator. Air-purifying, half-mask or full facepiece respirator with filters (pads or cartridges). Air-line abrasive-blasting helmet.
<u>COMBINATION GASES, VAPORS AND PARTICULATES</u>	
Immediately dangerous to life or health (IDLH)	Self-contained apparatus in positive pressure mode. Combination air-line respirator with auxiliary positive pressure self-contained air supply.

CELRB 385-1-1
APP N, Sec 1
1 Jul 99

Not immediately
dangerous to life
health

Air-line respirator.
Air-purifying, half-mask or full or
facepieces respirator with chemical
cartridges or canister and
appropriate filters.

TABLE A-2
PROTECTION FACTORS FOR PARTICULATE
FILTER RESPIRATORS

Concentration in multiples of the PEL or TLV	Facepiece Pressure	Permissible Respirators
5 X	- Single use dust	
10 X	- Half-mask dust - Half-or quarter mask, fume - Half-or quarter mask, high efficiency - Half-mask supplied air	
50 X	- Full facepiece, high-efficiency - Full facepiece, supplied air - Self-contained breathing apparatus (SCBA)	
1,000 X	+ Full facepiece, SCBA + Full facepiece supplied air and auxiliary self-contained air supply	
Fire fighting or emergency entry into unknown concentrations	+ Full facepiece SCBA	
Escape only <u>1</u> /	+ Any SCBA + Any self rescuer	

1/ In an atmosphere which is immediately dangerous to life or health.

- NOTES: 1. Half-mask and quarter-mask respirators should not be used. Particulate matter causes eye irritation at these concentrations.
2. Full facepiece supplied-air respirators should not be used in any atmosphere which is immediately dangerous to life or health unless it is equipped with an auxiliary air supply which can be operated in the positive pressure.

TABLE A-3
PROTECTION FACTORS FOR GAS
OR VAPOR RESPIRATORS

Concentrations in multiples of the PEL or TLV	Facepieces Pressure	Permissible Respirators
10 X	-	Half-mask chemical cartridge respirator with "Name" cartridges, or canister half mask, supplied-air
50 X	-	Full facepieces gas mask or chemical cartridge with "Name: cartridges or canister. Full facepieces SCBA Full facepieces supplied-air
1,000 X	+	Half-mask supplied-air
2,000 X	+	Supplied-air with full facepiece, hood, helmet or suit
10,000 X	+	Full facepiece, SCBA Full facepiece supplied air with auxiliary self-contained air supply
Fire fighting or emergency entry into unknown concentrations	+	Full facepiece SCBA
Escape only <u>1/</u>	+	Any full facepiece SCBA Any self-rescuer

1/ In an atmosphere which is immediately dangerous to life or health.

- NOTES: 1. The "Name" means approved chemical canisters or cartridges against a specific contaminant or a combination of contaminants such as organic vapor, acid gases, organic vapor plus particulates or acid gases plus organic vapor.
2. Quarter or half-mask respirators should not be used if eye irritation occurs at the use concentration.

3. Full facepieces supplied air respirators should not be used in any atmosphere which is immediately dangerous to life or health unless it is equipped with an auxiliary air tank which can be operated in the positive pressure mode.
4. Air purifying respirators cannot be used for contaminant having inadequate warning properties.